Application No: 10/069,556
Applicants: William S. Gornall et al.
Examiner: Patrick J. Connolly
Art Unit: 2877

CLAIMS

1 (original). An interferometer wavelength meter for measurement of the unknown wavelength of an input beam with respect to the known wavelength of a reference beam comprising a flexural pivot defining a pivot axis, an oscillating bar pivotally mounted on said pivot and having a retroreflector thereon spaced from said pivot axis, means for effecting oscillatory reciprocal movement of said oscillating bar over an arc within the bending limit of said pivot, said arc defining the range of said movement, a fixed retroreflector having a reflecting surface spaced from said oscillating bar and parallel thereto when said oscillating bar is in a position intermediate to said arc, a fixed end mirror presenting a reflecting surface to the beam passing through the moving and fixed retroreflectors and defining an end of a folded optical path, means for defining a common path of propagation for said input and reference beams along a path containing said moving and fixed retroreflectors and turning upon reflection from said fixed end mirror, which path executes repeated changes in length as said oscillating bar executes said reciprocal oscillatory motion about said axis.

2 (original). The interferometer according to Claim 1 further comprising a beamsplitter dividing each of said input beam and said reference beam along two paths and recombining said return beams to said measurement making means, and means for making said measurement based upon the interference of said returned input beams and said returned reference beams.

3 (original). The interferometer according to Claim 1 wherein said oscillating bar is balanced about said pivot axis and has two sides, each side carrying separate retroreflectors having centers spaced the same distance from said pivot axis, said reflecting surface of said fixed end mirror being opposed to said retroreflectors on said oscillating bar and being perpendicular to said oscillating bar when said bar is in the middle of the range of oscillation thereof.

4 (original). The interferometer according to Claim 3 wherein said fixed retroreflectors

define said path and are smaller than said retroreflectors on said oscillating bar and are opposed thereto whereby to increase the magnitude of the change in the length of said optical path over the path length change without said fixed retroreflector.

5 (original). The interferometer according to Claim 4 wherein said smaller retroreflectors have the centers thereof offset from the center of said larger retroreflectors on said bar, said offset providing spacing of said input and return beams which minimizes cross talk there between.

6 (original). The interferometer according to Claim 1 wherein said common path defining means comprises a beamsplitter for reflecting one of said input and reference beams and transmitting the other onto the same, common path.

7 (original). The interferometer according to Claim 2 further comprising a filter beamsplitter in the path of said return input and reference beams for separating said beams for application to said measurement making means.

8 (original). The interferometer according to Claim 2 wherein said input and reference beams are orthogonally polarized, and means for separating said beams for application to said measurement making means using a polarization sensitive beamsplitter.

9 (original). The interferometer according to Claim 2 wherein said common path defining means comprises means for multiplexing said input and reference beams ahead of said beamsplitter so that said input and reference beams are transmitted in samples thereof successively along said optical path, and said measurement making means comprises sampling means for the demultiplexing said returned input and reference beams for separate processing thereof to detect the interference of each of said reference and input beams.

10 (original). The interferometer according to Claim 1 wherein said common path defining means comprises first and second fiber optics separately carrying said input and reference beams, said fiber optics being coupled together to provide a common fiber launching said beams into said common path.

11 (original). The interferometer according to Claim 10 further comprising means for multiplexing said beams in said fiber optics for launching samples of said beams successively

into said common path.

12 (previously amended). A Michelson interferometer having an oscillatory bar, a flexural pivot bearing said bar for oscillation over an angular range of travel within the bending range of said pivot, a retroreflector carried on said bar, a fixed end mirror presenting a reflecting surface to said retroreflector and defining an end of a folded optical path the length of which is repeatedly changed as said bar oscillates, means for projecting an input beam of unknown wavelength and a reference beam of known wavelength simultaneously or successively in coincident relationship along said optical path which is of the same length and undergoes the same change in length with oscillation of said oscillatory bar, and means responsive to interference in said input beam before and after return from said end mirror and interference between said reference beam before and after return from said end mirror for measuring wavelength of said input beam with respect to said reference beam.

13 (original). The interferometer according to Claim 12 wherein said reflecting surface is parallel to said oscillatory bar at an intermediate position of said oscillatory bar within said angular range of oscillation.

14 (original). The interferometer according to Claim 12 further comprising a detector responsive to interference of said beam, a beamsplitter along said path between said fixed end mirror and said detector.

15 (original). The interferometer according to Claim 12 wherein said oscillatory bar has ends on opposite sides of a pivot axis defined by said flexural pivot, said retroreflector being one of a pair of retroreflectors spaced from each other equal distances from said axis.

16 (original). The interferometer according to Claim 15 wherein said oscillating bar and retroreflectors are balanced about said axis.

17 (previously amended). A Michelson interferometer having an oscillatory bar, a flexural pivot bearing said bar for oscillation over an angular range of travel within the bending range of said pivot, a retroreflector carried on said bar, a fixed end mirror presenting a reflecting surface to said retroreflector and defining an end of a folded optical path the length of which is repeatedly changed as said bar oscillates and along which path an optical beam is in interfering

relationship for wavelength measurement wherein at least one fixed retroreflector is opposed to said retroreflector on said oscillatory bar, said fixed retroreflector is smaller in width than said retroreflector on said oscillatory bar and has a center offset from a center of said retroreflector on said oscillatory bar, said optical beam incident on said fixed end mirror being an incident beam and said beam returned from said end mirror being a return beam.

18 (original). The interferometer according to Claim 17 wherein said retroreflectors have a central axis, said central axis of said retroreflectors being aligned in offset relationship with said incident and return beams.

19 (original). The interferometer according to Claim 17 wherein a plurality of smaller fixed retroreflectors are disposed with their reflecting surfaces opposing the reflecting surfaces of said retroreflector on said oscillatory bar, and said smaller retroreflectors having central axes offset from the central axis of said retroreflector on said oscillatory beam.

20 (original). The interferometer according to Claim 17 wherein said incident and return beams are incident on said retroreflectors generally along a single line intersecting a central axis of said retroreflectors.

21 (original). The interferometer, according to Claim 17, wherein said incident and return beams are incident on said retroreflectors along lines which are offset on opposite sides of the line intersecting the central axis of said retroreflectors.

22 (original). The interferometer according to Claim 12 further comprising electromagnetic actuator means in proximity to said oscillatory bar for generating magnetic forces perpendicular to said pivot axis to cause flexural oscillation of said oscillatory bar.

23 (previously cancelled).

24 (original). The interferometer according to Claim 12 wherein said spacing of said retroreflectors with respect to said flexural pivot and wherein said retroreflectors are sized so as to define a change in optical path of 100mm or more as said oscillatory bar moves over said angular range.

25 (amended). An interferometer which measures the wavelength of a beam of unknown wavelength with respect to a reference beam of known wavelength which comprises means for

propagating said beams simultaneously or successively in coincident relationship and in the same direction along an optical path which undergoes a change in length, and means responsive to interference in said beams for measuring said wavelength of said input beam with respect to said reference beam.

26 (original). The interferometer according to Claim 25 further comprising an oscillatory bar having at least one retroreflector and a fixed mirror for defining said optical path which undergoes said change in length.